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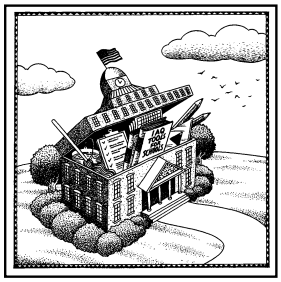
CASE STUDY

LITTLE HARBOUR SCHOOL

Portsmouth School Department, Portsmouth, New Hampshire

Indoor Air Quality



Tools for Schools

Little Harbour School, part of the Portsmouth School Department, is located in historic Portsmouth, New Hampshire's second oldest city. The school serves approximately 400 students enrolled in grades K-5.

Approach—Project Description

School Description

Originally built in 1969, Little Harbour School is one of five schools that make up the Portsmouth School Department, which is managed and funded by the city of Portsmouth. This two-story brick building was built in three distinct pods: an auditorium, an administrative section, and classrooms. The style reflected the popular theory of the time that students learn better in an open environment. When this method of learning was no longer considered efficient, the pods/open classrooms were divided into smaller, separate classrooms. The school is 59,394 square feet and is serviced by a forced air-hot water heating ventilation and air conditioning (HVAC) system.

"The IAQ TfS Kit helped guide our Team through the process of discovery and solution."

-Peter Torrey Portsmouth School Department Business Administrator

IAQ Team

Priscilla Santiago, the school nurse for Little Harbour School, became concerned about high student absenteeism rates, the high number of children complaining of respiratory problems, and the diagnosis of three middle-aged teachers with asthma, in the early 1990's. Suspecting a potential indoor air quality (IAQ) problem, she distributed a two-part questionnaire to staff in January of 1993: a personal health survey and an assessment of the teachers' surroundings (i.e., classrooms). She was amazed to learn from the results that many teachers had problems with chronic bronchitis and sinusitis.

While attending a workshop on EPA's *Indoor Air Quality Tools for Schools* (*IAQ TfS*) Program in 1996, Ms. Santiago learned about the *IAQ TfS* Kit. Upon her return, she was determined to make her school a healthier place for students and staff. She gained support from the school department business administrator (who had recently attended an IAQ workshop and who worked in Little Harbour School), parents, teachers, and the Superintendent's office.

In October of 1996, the New Hampshire Coalition for Occupational Safety and Health (NHCOSH), a non-profit organization providing *IAQ TfS* training through an EPA grant, contacted Little Harbour School about participating in a IAQ pilot program. Little Harbour joined the program along with Pennichuck Junior High School of the Nashua School District. The IAQ Team at Little Harbour included people of various backgrounds: Ms. Santiago, the school department business administrator, a school custodian, the head of maintenance for the school department, three teachers, and an occupational nurse.

NHCOSH held regular meetings for the two pilot schools, encouraging them to interact and learn from each other's experiences. The organization also provided these schools with the technical assistance of an engineer from a local firm and an industrial hygienist employed by the New Hampshire Department of Health and Human Services, Occupational Health section.

Problem Identification

While the engineer helped the IAQ Team conduct walkthroughs and identify IAQ problems, the industrial hygienist helped the schools coordinate the use of the *IAQ TfS* Kit by breaking the process into easily definable steps.

Using the Kit, the IAQ Team identified, organized, and prioritized IAQ problems. One of the biggest problems discovered at Little Harbour was the ventilation system. Originally built for large open

(over)

"We saw a significant decrease in the absenteeism rates of children, especially with a severe asthmatic attending the school, since we completed the IAQ upgrades."

-Priscilla Santiago School Nurse, Little Harbour School

spaces, the ventilation system was not redesigned when walls were constructed to create smaller classrooms. With only two return-air vents (and corresponding thermostats) on each floor, air was not properly circulating through the classrooms. During their walkthroughs, the IAQ Team realized that the thermostat controls and several outside air ventilators were not functional. In addition, return-air vents were closed or blocked with books and bookcases, further preventing proper airflow through the school. The Team determined that approximately one-quarter of the school's classrooms were not receiving any air flow at all. Similar ventilation problems existed in the school offices.

Other problems identified by the IAQ Team included:

- Old carpet (dating back to when the school was built in 1969).
- Fungal and mildew growth in classrooms (primarily in classrooms with a high number of plants).
- Water-damaged carpet from leaky faucets in the classrooms.
- Dust and dirt being tracked in from outside because entryway/run-offs mats were not present.
- Poorly insulated and non-functioning windows that leaked air and water and could only be opened to a small portion of their potential height.

Mapping out the identified IAQ problems, and comparing them to where the students and teachers with high absenteeism rates and health problems resided in the school, revealed that absenteeism and health problems were more prevalent in the poorly/inadequately ventilated classrooms where plants and old carpet existed.

Lessons Learned

Short-Term Solutions

The Team focused on making the immediate, low-cost changes throughout the school. These repairs were completely funded by the Portsmouth School Department. One of the first projects was to replace a malfunctioning pulley system, a relatively low-cost solution that resulted in a 35 percent improvement in the school's air flow. Air vents were unblocked in the classrooms, and signs were posted asking teachers and staff to keep the vents open and free of blockage. These signs also informed teachers that the air circulation for the entire floor is immediately altered when doors are closed.

Other IAQ upgrades implemented by the IAQ Team included: replacing all windows with efficient, double-hung windows; initially replacing the carpet with tile in high traffic areas and some classrooms; placing heavy grates and run-off mats in entryways to catch dirt; using vacuums with HEPA filters; and enhancing housekeeping/custodial activities.

As a result of the upgrades performed to date, there has been a dramatic decrease in absenteeism and an increase in comfort. Visits to the nurse's office with complaints of stomachaches and headaches decreased by 25 percent the first five months after the Kit was used.

Long-Term Practices and Policies

The IAQ Team at Little Harbour School is currently identifying funds to replace the ventilation system. The successful implementation of the *IAQ TfS* Kit and positive results at Little Harbour School have prompted other schools in Portsmouth to become interested in the *IAQ TfS* Program. The city is also focused on a $38 million upgrade to Portsmouth High School, which will include an overhaul of all operating systems. This project includes upgrades to HVAC, energy management, mechanical, electrical, and plumbing systems. Because Little Harbour was the pilot for *IAQ TfS*, it set the precedent for all schools in the city to create a healthy and safe learning environment.

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